RTCA DO-260A

1090MHz ES

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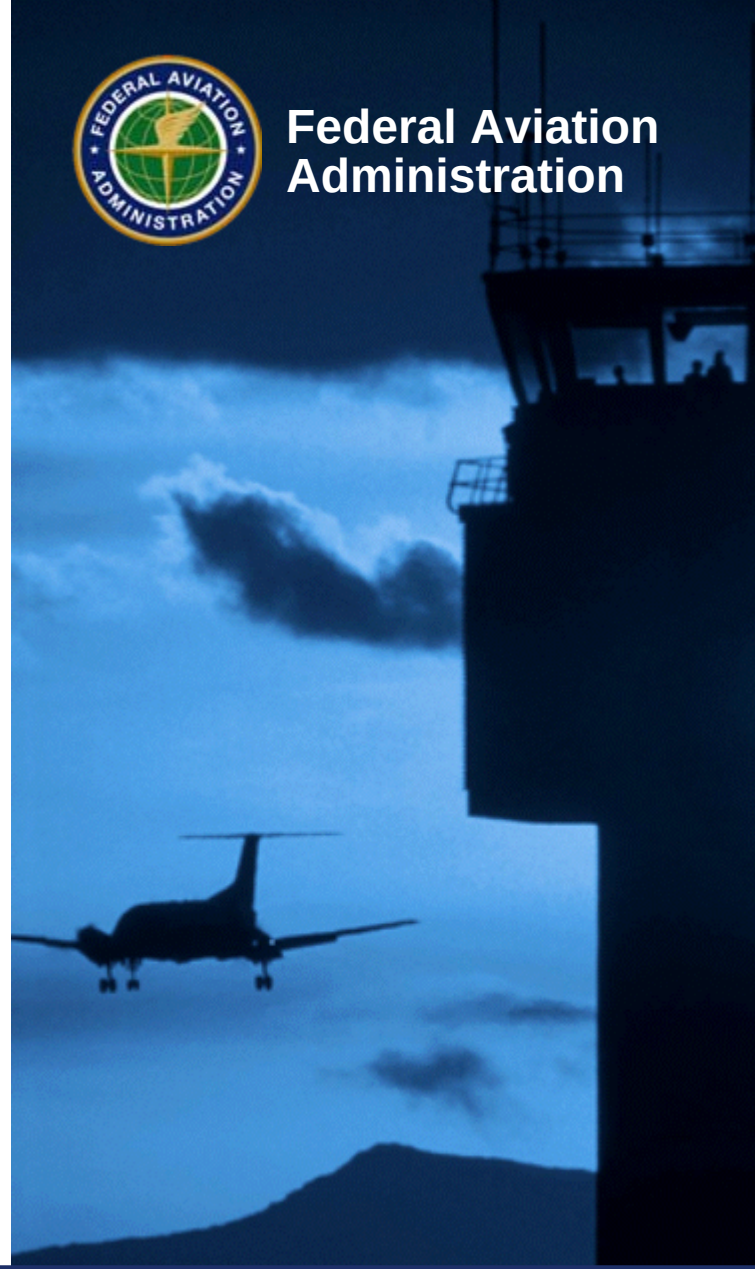

OUTLINE:

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DO-260 vs. DO-260A

During the development of DO-260, it was always the intention of RTCA and the International community to update the initial 1090ES MOPS with the addition of enhanced reception techniques, as well as improved definitions of navigational accuracy and integrity measurements, and system integrity levels, among other things. It was agreed that first we had to update the ADS-B MASPS on which those standards were to be based.

RTCA published the updated ADS-B MASPS as RTCA/DO-242A on June 25, 2002. Consequently the revision of the 1090ES MOPS was also begun.

On April 10, 2003 RTCA published RTCA/DO-260A as the update to the 1090ES MOPS which was intended to replace RTCA/DO-260 and all of its requirements.

1090 MHz ES Historical Timeline:

- DO-242 – ADS-B MASPS published – 2/18/1998
- DO-260 – 1090ES MOPS published – 9/13/2000
- DO-242A – ADS-B MASPS revised – 6/25/2002
- DO-260A – 1090ES MOPS revised – 4/10/2003
- TSO C166 – modifications to both DO-260 and DO-260A published – 9/20/2004
- TSO C166A – eliminates certification of DO-260 systems, and performs further MODS to DO-260A

Changes Between DO-260 and DO-260A

(Sheet 1 of 2)

- Addition of Requirements for Enhanced Processing Techniques
- Addition of materials defining TIS-B Message formats
- Change of NUCP and NUCV into NIC, NAC, SIL
- Changed the structure of the Operational Status Message Capability Class (CC) and Operational Mode (OM) subfields to reflect changes in DO-242A
- Deleted TCP/TCP+1 Messages, added Target State and Status Message, and added placeholders for Target Change Reports to reflect requirements in DO-242A

Changes Between DO-260 and DO-260A

(Sheet 2 of 2)

- Deleted the Operational Coordination Message
- Updated all messages and report structures dealing with State Vector, Mode Status, ARV and Target State Reports to reflect changes made in DO-242A
- Other minor changes called for in DO-242A
- Performed all changes in a way that ensured interoperability between DO-260 and DO-260A equipment

TSO C166 changes to DO-260

(Sheet 1 of 2)

- Changes to the Air/Ground Determination to correct errors discovered during ICAO review of draft UAT SARPs. Identical changes also made in ASA MASPS (DO-289) and UAT MOPS (DO-282A).
- Change the definition of how to encode NUC if HPL is not available, because of problems encountered in Australia 1090ES trials.
- Direction to manufacturers not to implement any Aircraft Trajectory Intent Messages.

TSO C166 changes to DO-260

(Sheet 2 of 2)

- Direction to manufacturers not to implement any Aircraft Operational Coordination Messages.
- Defined the optional transmission of the TEST Message (TYPE Code=23) for the

  purpose of transmitting the Mode 3/A (4096) Code.
- Modified all test procedures involved with testing the Air/Ground Determination.
- Added a test procedure if the manufacturer optionally implements transmission of the TEST Message.

TSO C166 changes to DO-260A

(Sheet 1 of 2)

- Changes to the Air/Ground Determination to correct errors discovered during ICAO review of draft UAT SARPs. Identical changes also made in ASA MASPS (DO-289) and UAT MOPS (DO-282A).
- Addition of the definition of a DF=18, CF=6 as the Rebroadcast of an ADS-B Message from an alternate data link using the same TYPE Codes and Message Formats as are defined for DF=17 ADS-B Messages.
- Renamed the TIS-B Airborne Velocity Message to “TIS-B Velocity Message” throughout.
- Hard wire the Vertical and Horizontal Mode Indicators to ZERO because of inconsistencies with how onboard data sources represent the data associated with these parameters.
- Made changes to the Aircraft/Vehicle Length and Width Code Encoding to correct problems identified during ICAO review of draft UAT SARPs. Identical changes also made in ASA MASPS (DO-289) and UAT MOPS (DO-282A).

TSO C166 changes to DO-260A

(Sheet 2 of 2)

- Added notes indicating that it is not necessary to perform a Globally Unambiguous CPR Decode if a participant is already in a Track File as either an Airborne or Surface participant.
- Specified that TIS-B Messages, including the Management Message be reported as transmitted.
- Modified all test procedures involved with preceding changes.
- Specified all corresponding changes in Appendix A.
- Added a new §A.1.7.8 entitled “Globally Unambiguous CPR Decoding of Surface Position.”
- Corrected several typographical errors throughout the entire document.

Changes Between TSO C166 & TSO C166A

(Sheet 1 of 3)

- 1) All references to RTCA/DO-260 have been removed.
- 2) The following changes have been added in addition to the original TSO C166 changes for RTCA/DO-260A, and the Appendix 1, Section number of the change was changed from (2) to (1):
  - ✓ **Corrected entries in the "Operation" column of Table 2-6 left over from a cut-and-paste error**
  - ✓ **Corrected errors in Table 2-51 for Binary and Decimal values for Zero and +100 feet encoding**
  - ✓ **Added a Note in Operational Status Message to caution that SIL not to be set to ZERO**
  - ✓ **Added section §2.2.18 as the definition of Re-Broadcast Messages with changed bit definitions for IMF**
  - ✓ **Changed Test Procedure for TYPE Code – Airborne**

Changes Between TSO C166 & TSO C166A

(Sheet 2 of 3)

Changes added in addition to the original TSO C166 changes for RTCA/DO-260A continued:

- ✓ **Changed Test Procedure for TYPE Code – Surface**
- ✓ **Removing Test Procedure and pointing to the one in §2.4.3.2.4.1 (change to TYPE Code for Surface)**
- ✓ **Fixed a problem reported by Rockwell Collins with testing Target State on-the-ground**
- ✓ **Fixed several typos in Table 2-188 - NUCp → NIC – NAC – SIL**
- ✓ **Added section §2.4.18 for a Test Procedure for the Re-Broadcast Messages with changed bits for IMF**
- ✓ **Corrected a references in Appendix A**
- ✓ **Added a Note in Appendix A, Target State and Status Message to caution that SIL not to be set to ZERO**

Changes Between TSO C166 & TSO C166A

(Sheet 3 of 3)

Changes added in addition to the original TSO C166 changes for RTCA/DO-260A continued:

- ✓ **Added a Note in Appendix A, Operational Status Message to caution that SIL not to be set to ZERO**
- ✓ **Correction to problem noted by Australia for Non-Transponder Devices to be consistent with SARPs**
- ✓ **Added section §A.3 as the Appendix A definition of Re-Broadcast Messages with changed bits for IMF**
- ✓ **Removed the 95% column from Table N-4 and delete Note #3**
- ✓ **Fix Typos in Appendix O, Table O-3, reported by Ron Jones**

DO-260A Next steps

The work continues through RTCA SC-186 WG3.

Near term effort is to-

Publish the set of changes that are identified in the draft of the TSO-C166A Appendix as-

“Change 1” to DO-260A.

Subsequent publication of FAA TSO-C166A.

Acknowledgements

This work has been developed
through the hard work efforts of-

RTCA SC-186
Working Group (WG) 3